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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/812,326	03/29/2004	Louie Arthur Dickens	TUC920030125US1	2721

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KONRAD RAYNES & VICTOR, LLP.
ATTN: IBM37
315 SOUTH BEVERLY DRIVE, SUITE 210
BEVERLY HILLS, CA 90212

EXAMINER	
UNELUS, ERNEST	
ART UNIT	**PAPER NUMBER**
2181	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/15/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/812,326	DICKENS ET AL.	
	Examiner	Art Unit	
	Ernest Unelus	2181	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 02/07/07.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6,8-17, and 19-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,8-17 and 19-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

RESPONSE TO AMENDMENT

Claim rejections based on prior art

Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Applicant's arguments with respect to claims 1-6, 8, 9, 11-17, 19, 20, and 22-30 have been considered but are moot in view of the new ground(s) of rejection

The applicant argues that the cited Downer reference doesn't discloses a diagnostic operation with respect to I/O controller.

In regards to a "diagnostic operation", the claim doesn't specify what the diagnostic is. According to the claim language, it's not part of the signal; in other word, this diagnostic doesn't rule out any other regular diagnostic. A diagnostic is simple a test.

In column 8, lines 11-27, Downer discloses the devices, the computer hosts 14-20, which are serve as the reconnection inhibiter, initiator, and I/O controller, are able to check and determine on each other; in other word, a higher-priority initiator poll on a lower-priority initiator and wait for a ping. This is a form of diagnostic.

The applicant has canceled claims 7 and 18.

I. INFORMATION CONCERNING OATH/DECLARATION

Oath/Declaration

1. The applicant's oath/declaration has been reviewed by the examiner and is found to conform to the requirements prescribed in **37 C.F.R. 1.63.**

II. INFORMATION CONCERNING OATH/DECLARATION

Oath/Declaration

2. The applicant's oath/declaration has been reviewed by the examiner and is found to conform to the requirements prescribed in **37 C.F.R. 1.63.**

III. INFORMATION CONCERNING DRAWINGS

Drawings

3. The applicant's drawings submitted are acceptable for examination purposes.

IV. ACKNOWLEDGEMENT OF REFERENCES CITED BY APPLICANT

4. As required by **M.P.E.P. 609(C)**, the applicant's submissions of the Information Disclosure Statement dated March 29, 2004 is acknowledged by the examiner and the cited references have been considered in the examination of the claims now pending. As required by **M.P.E.P 609 C(2)**, a copy of the PTOL-1449 initialed and dated by the examiner is attached to the instant office action.

V. REJECTIONS BASED ON PRIOR ART

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. **Claims 1-6, 8-17, and 19-31**, are rejected under 35 U.S.C. 103(a) as being unpatentable over Downer (US pat. 6,223,244) in view of Dekoning et al. (US pat. 6,009,275).

7. As per **claim 1**, Downer discloses "A method, comprising: signaling **(which also means to select, as discloses by the applicant on page 5, paragraph 0014)**, as part of a diagnostic operation with respect to an Input/Output (I/O) controller **(see col. 8, lines 11-27, which discloses the computer hosts 14-20, which serve as the reconnection inhibiter, initiator, and I/O controller, are able to check and determine on each other; in other words, a higher-priority initiator polls on a lower-priority initiator and waits for a ping. This is a form of diagnostic)**, a reconnection inhibitor **(Host computer 16 in fig. 1)** over a bus **(SCSI bus 12 of fig. 1)** to cause the reconnection inhibitor to access the bus to inhibit an Input/Output (I/O) controller **(SCSI controller 18 of fig. 1)** from accessing the bus [**(as discloses by Downer, once the reconnection inhibiter (Host computer 16 in fig. 1) has access or ownership of the bus, the I/O controller (SCSI controller 18 of fig. 1) will be prevent from accessing the bus. See for example col. 1, line 53 to col. 2, line 10)**]; and transmitting, as part of a diagnostic operation

(see col. 8, lines 11-27), by an initiator **(Host computers 14 in fig. 1)**, I/O requests on the bus to the I/O controller **(Downer discloses the initiators (Host computer 14-20) on the bus communicate among each other though requests; "*Initiators communicate with targets through bus requests called commands*", as stated in col. 1, lines 46 and 47. The computer hosts can be both initiators and target, as discloses in col. 1, line 35, "SCSI devices are either initiators or targets, or <u>both</u>". In other word, a computer host device that's acting as an initiator will transmit and a second computer host that's acting as target will receive; as col. 1, lines 53-54 discloses "The SCSI architecture allows two, and only two, devices to communicate with each other over its bus simultaneously". In regards to 'as part of the diagnostic operation', this is the polls and pings, which obviously are not requests. However, the polls and pings are part of or play a roll on the number of requests that are transfer over the bus. They are part of the 'operation')**, wherein the I/O requests are queued in an I/O queue **(Downer discloses the initiators (Host computers 14-20) on the bus communicate among each other through request; "*Initiators communicate with targets through bus requests called commands*", as stated in col. 1, lines 46 and 47. Therefore, as it well known in the art, requests are stored in storage devices such as queue, FIFO, or buffers. As also discloses in the 'Description of the related art' section, page 2, from the applicant's specification "The storage controller 6 I/O queue". In the same way, the SCSI controllers of the host computers 14-20 will inherently have queues as well)**; wherein the I/O controller is inhibited by the reconnection inhibitor from draining while the initiator transmits requests to the I/O controller **(as Downer discloses, when Host computer 14, the initiator with the highest priority ID, has access to the bus, automatically, the I/O controller (SCSI**

controller 18 of fig. 1) is inhibited by the reconnection inhibitor from draining request, which are in a storage device like a queue or a buffer; see for example col. 1, line 53 to col. 2, line 10); and performing diagnostic testing of the I/O controller when the I/O queue is at different levels **(As stated above, the diagnostic is interpreted as when a higher-priority initiator polls on a lower-priority initiator and wait for a ping. In regards to "when 'the I/O queue' is at different", the claim language doesn't specify as to which device on the bus this I/O queue belongs too. Downner discloses the initiators (Host computers 14-20) on the bus communicate among each other though request; "*Initiators communicate with targets through bus requests called commands*", as stated in col. 1, lines 46 and 47. Therefore, as a request is transmitted from an initiator, the device with the current ownership of the bus, the number of request from the initiator will be decremented by one. As it known in the art, requests are stored in storage devices such as queue, FIFO, or buffers)**, wherein the level of I/O requests pending in the I/O queue is controlled by the signaling of the reconnection inhibitor **(see col. 2, line 66 to col. 3, line 5, which discloses "If so, the higher-priority device is notified to limit the sending of new requests to the bus. The notifying may include sending a signal to the higher-priority device that the lower-priority device does not have sufficient access to the bus. The limiting of requests may include limiting new requests by the higher-priority device to its share of the bus bandwidth". Col. 4, lines 41-60, discloses the 'notification' as the pings and polls, which control or determine the chance that an initiator has to empty out it's queue on the bus).**

Downner doesn't clearly express or shows a SCSI controller having a queue, even if it is clearly express above. However, Dekoning clearly shows a SCSI controller having an I/O queue **(see fig. 4A and col. 5, lines 14-26)**.

Downer (US pat. 6,223,244) and Dekoning et al. (US pat. 6,009,275) are analogous art because they are from the same field of endeavor of data transfer base on priority.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to modify the method is described and shown herein for assuring device access to a bus having a fixed priority arbitration scheme such as a SCSI bus as described by Downer and a resource allocation logic for a computer system including a plurality of processors which share access to, and control of, a plurality of resources, such as disk drive units or busses as taught by Dekoning.

The motivation for doing so would have been because Dekoning teaches **"The Inter-Controller Communication Chip (hereafter referred to as the ICON chip) contains all functions necessary to provide high speed serial communication and resource arbitration/allocation between two Disk Array controllers. The primary application for the ICON chip is in Disk Array systems utilizing redundant disk array controllers. Because the redundant controller configuration shares resources (disk drives and SCSI buses) between two controllers, a method of arbitrating for these common resources must be utilized in order to prevent deadlocks and to maximize system performance"; see col. 4, lines 54-64).**

Therefore, it would have been obvious to combine Dekoning et al. (US pat. 6,009,275) with Downer (US pat. 6,223,244) for the benefit of creating a method with a SCSI controller having a queue to obtain the invention as specified in claim 1.

8. As per **claims 2, 13, and 24**, the combination of Downer and Dekoning discloses "The method of claim 1," **[See rejection to claim 1 above]** Downer further discloses "wherein the initiator accesses the bus at a higher priority than the reconnection inhibitor **(page 1, paragraph 0003, on the applicant specification discloses "*initiator 4 is assigned the highest SCSI device address, address seven*". Page 7, paragraph 0019 also discloses "*where the test initiator 38 may assert bus address 7 to select the reconnection inhibitor 36, which may be bus address 6*". Similarly, in col. 1, lines 56-65, Downer discloses, "Each SCSI device has a unique bus ID which users set using switches, jumpers, or set-up routines. SCSI IDs range from seven (highest priority device ID) to zero (lowest priority device ID) for regular SCSI and up to 15 for the Wide SCSI variation. With wide SCSI the priority is from seven (highest priority device ID) to zero followed by 15 to eight (lowest priority device ID). Hosts typically have the highest SCSI bus ID, allowing them to initiate requests with minimum peripheral device interference")**; and wherein the reconnection inhibitor accesses the bus at a higher priority than the I/O controller **(with respect to what is discloses above, Host computer 14 in fig. 1, the reconnection inhibitor will be assigned a SCSI ID of 6, which gives it a higher priority than the I/O controller (Host computer 18 in fig. 1). The I/O controller will be assigned with the next level priority, which will be 5)**.

9. As per **claims 3, 14, and 25**, the combination of Downer and Dekoning discloses "The method of claim 2," **[See rejection to claim 2 above]** Downer further discloses "wherein the initiator uses a first device identifier to communicate with the bus **(page 1, paragraph 0003, on the applicant specification discloses "*initiator 4 is assigned the highest SCSI device address, address seven*". Page 7, paragraph 0019 also discloses "*where the test initiator 38 may assert bus address 7 to select the reconnection inhibitor 36, which may be bus address 6*". Similarly, in col. 1, lines 56-65, Downer discloses, "Each SCSI device has a unique bus ID which users set using switches, jumpers, or set-up routines. SCSI IDs range from seven (highest priority device ID) to zero (lowest priority device ID) for regular SCSI and up to 15 for the Wide SCSI variation. With wide SCSI the priority is from seven (highest priority device ID) to zero followed by 15 to eight (lowest priority device ID). Hosts typically have the highest SCSI bus ID, allowing them to initiate requests with minimum peripheral device interference"). With respect to what is discloses above, Host computer 16 in fig. 1, the reconnection inhibitor will be assigned a SCSI ID of 6, which gives it a higher priority than the I/O controller (Host computer 18 in fig. 1). The I/O controller will be assigned with the next level priority, which will be 5),** the reconnection inhibitor uses a second device identifier to communicate with the bus **(see above)**, and the I/O controller uses a third device identifier to communicate with the bus **(see above)**, wherein the first device identifier has priority over the second device identifier **(see above)**, and wherein the second device identifier has priority over the third device identifier **(see above)**.

10. As per **claims 4, 15, and 26**, the combination of Downer and Dekoning discloses "The method of claim 1," **[See rejection to claim 1 above]** Downer further discloses "wherein the initiator signals the reconnection inhibitor to arbitrate on the bus when a device other than the initiator is arbitrating on the bus **(this is done simply when the initiator with the highest ID number let go of the bus; the one with the second highest ID will get on, as discloses in col. 1, lines 61-65. Also, the initiator letting go of the bus is way of signal the next priority level to take over).**

11. As per **claims 5, 16, and 27**, the combination of Downer and Dekoning discloses "The method of claim 1," **[See rejection to claim 1 above]** Downer further discloses "signaling the reconnection inhibitor to cease accessing the bus **(this is done simply when the initiator with the highest ID number let go of the bus; the one with the second highest ID will get on, as discloses in col. 1, lines 61-65. Also, the initiator letting go of the bus is way of signal the next priority level to take over)**, wherein the I/O controller accesses the bus to complete processing of an I/O request and process further I/O requests in the I/O queue in response to the reconnection inhibitor ceasing to issue requests on the bus" **(once the initiator, Host computer 14, let go of the bus, the I/O controller, Host computer 18, accesses the bus to complete processing of an I/O request and process further I/O requests in the I/O queue in response to the reconnection inhibitor, Host computer 16, ceasing to issue requests on the bus. See col. 2, lines 8-12).**

12. As per **claims 6, 17, and 28**, the combination of Downer and Dekoning discloses "The method of claim 5," **[See rejection to claim 5 above]** Downer further discloses "wherein the level of I/O requests pending in the I/O queue is controlled by signaling the reconnection inhibitor **(this will automatically happen when the reconnection inhibiter, Host computer 16 of fig. 1, try to gain access of the bus because its has I/O requests pending in its I/O queue. For example see col. 2, lines 8-12)**, wherein the I/O queue is increased by signaling the reconnection inhibitor to access the bus to inhibit the I/O controller from accessing the bus and depleting the I/O queue **(once the I/O queue of the I/O controller (Host computer 18) lost ownership of the bus, its queue will increase when the initiator begins to send requests to it. For example, see col. 2, lines 6-12)**, and wherein the I/O queue is decreased by signaling the reconnection inhibitor to cease accessing the bus to inhibit the I/O controller **(once the I/O queue of the reconnection inhibiter (Host computer 16) gain ownership of the bus, its queue will decrease when the initiator begins to send requests to it. For example, see col. 2, lines 6-12)**.

13. As per **claims 8, 19, and 29**, the combination of Downer and Dekoning discloses "The method of claim 1," **[See rejection to claim 1 above]** Downer further discloses "wherein the reconnection inhibitor accesses the bus to inhibit the I/O controller when the I/O controller attempts to arbitrate on the bus [**(once the reconnection inhibitor (Host computer 16) gain access of the bus, because of its higher priority than the I/O controller (Host computer 16), will prevent the I/O controller when the I/O controller attempts to arbitrate on the bus) see col. 1, Lines 53-65**].

14. As per **claims 9, 20, and 30**, the combination of Downer and Dekoning discloses "The method of claim 1," **[See rejection to claim 1 above]** Downer further discloses "wherein the reconnection inhibitor inhibits the I/O controller from processing further I/O requests in the I/O queue by preventing the I/O controller from communicating with the initiator over the bus to complete I/O requests [**(once the reconnection inhibitor (Host computer 16) gain access of the bus, because of its higher priority than the I/O controller (Host computer 16), will prevent the I/O requests in the I/O controller's queue from communicating with the initiator over the bus to complete I/O requests) see col. 1, Lines 42-65**].

15. As per **claims 10, 21, and 31**, the combination of Downer and Dekoning discloses "The method of claim 1," **[See rejection to claim 1 above]** Dekoning further discloses "wherein the I/O controller **(Disk Array Controller A 11 of fig. 3)** comprises a storage controller **(Inter-Controller Communication Chip 61 of fig. 2)**, and wherein the I/0 requests comprise read and write requests directed to a storage system managed by the I/0 controller **(see col. 5, lines 14-26)**.

16. As per **claims 11 and 21**, the combination of Downer and Dekoning discloses "The method of claim 1," **[See rejection to claim 1 above]** Dekoning further discloses "wherein the bus comprises a SCSI parallel bus" **(see col. 1, lines 12-20 and the program in col. 13, which discloses transmission in parallel)**.

17. As per __claim 12__, Downer discloses "A system, comprising: a reconnection inhibitor **(Host computer 16 in fig. 1)**; an initiator **(Host computer 14 in fig. 1)**; an Input/Output (I/O) controller **(SCSI controller of the Host computer 18 of fig. 1)**; a bus **(SCSI bus 12 of fig. 1)**, wherein the reconnection inhibitor, initiator, and the I/O controller communicate over the bus **(see fig. 1)**; circuitry in the initiator capable of causing operations comprising **(all electric devices are function by electric circuitry)**: (i) signaling **(which also means to select, as discloses by the applicant on page 5, paragraph 0014)**, as part of a diagnostic operation with respect to an Input/Output (I/O) controller **(see col. 8, lines 11-27, which discloses the computer hosts 14-20, which are serve as the reconnection inhibiter, initiator, and I/O controller, are able to check and determine on each other; in other word, a higher-priority initiator polls on a lower-priority initiator and wait for a ping. This is a form of diagnostic)**, the reconnection inhibitor over the bus **(as discloses by Downer, once the reconnection inhibiter (Host computer 16 in fig. 1) has access or ownership of the bus, the I/O controller (SCSI controller 18 of fig. 1) will be prevent from accessing the bus. See for example col. 1, line 53 to col. 2, line 10)**; and (ii) transmitting, as part of a diagnostic operation **(see col. 8, lines 11-27)**, I/O requests on the bus to the I/O controller after signaling the reconnection inhibitor **(col. 2, lines 1-12, discloses "To begin the arbitration phase, each interested device detects a bus free phase. It then places its bus ID on the bus by asserting its associated data bus signal (i.e., device seven asserts a signal on data line seven while device two asserts a signal on data line two). After a brief delay, the device with the highest bus ID value signals its victory and directs lower-priority devices to the back off the bus. The winning device then proceeds through a number of additional phases to complete its task. The losing device**

must wait for the bus to achieve another bus free phase, at which time it again asserts its associated data bus signal in an attempt to gain control of the SCSI bus"); and (iii) performing diagnostic testing of the I/0 controller when the I/0 queue is at different levels **(As stated above, the diagnostic is interpreted as when a higher-priority initiator polls on a lower-priority initiator and wait for a ping. In regards to "when 'the I/O queue' is at different", the claim language doesn't specify as to which device on the bus this I/O queue belongs too. Downner discloses the initiators (Host computers 14-20) on the bus communicate among each other though request; "*Initiators communicate with targets through bus requests called commands*", as stated in col. 1, lines 46 and 47. Therefore, as a request is transmitted from an initiator, the device with the current ownership of the bus, the number of request from the initiator will be decremented by one. As it known in the art, requests are stored in storage devices such as queue, FIFO, or buffers)**, wherein the level of I/0 requests pending in the I/0 queue is controlled by the signaling of the reconnection inhibitor **(see col. 2, line 66 to col. 3, line 5, which discloses "If so, the higher-priority device is notified to limit the sending of new requests to the bus. The notifying may include sending a signal to the higher-priority device that the lower-priority device does not have sufficient access to the bus. The limiting of requests may include limiting new requests by the higher-priority device to its share of the bus bandwidth". Col. 4, lines 41-60, discloses the 'notification' as the pings and polls, which control or determine the chance that an initiator has to empty out it's queue on the bus)**; and circuitry in the reconnection inhibitor capable of accessing the bus to inhibit the Input/Output (I/O) controller from accessing the bus in response to receiving the signal from the initiator [**(as discloses by Downer, once the**

reconnection inhibiter (Host computer 16 in fig. 1) has access or ownership of the bus, the I/O controller (SCSI controller 18 of fig. 1) will be prevent from accessing the bus. See for example col. 1, lines 53-65)], wherein the I/O requests transmitted by the initiator are queued in an I/O queue **(Downer discloses the initiators (Host computers 14-20) on the bus communicate among each other through request; "*Initiators communicate with targets through bus requests called commands*", as stated in col. 1, lines 46 and 47. Therefore, as it well known in the art, requests are stored in storage devices such as queue, FIFO, or buffers. As also discloses in the 'Description of the related art' section, page 2, from the applicant's specification "The storage controller 6 I/O queue". In the same way, the SCSI controllers of the host computers 14-20 will inherently have queues as well)**, wherein the I/O controller is inhibited by the reconnection inhibitor from draining the queue while the initiator transmits requests to the I/O controller **(as Downer discloses, when Host computer 14, the initiator with the highest priority ID, has access to the bus, automatically, the I/O controller (SCSI controller 18 of fig. 1) is inhibited by the reconnection inhibitor from draining request, which are in a storage device like a queue or a buffer; see for example col. 1, line 53 to col. 2, line 10)**. Downer doesn't clearly express or shows a SCSI controller having a queue, even if it is clearly express above. However, Dekoning clearly shows a SCSI controller having an I/O queue **(see fig. 4A and col. 5, lines 14-26)**.

Downer (US pat. 6,223,244) and Dekoning et al. (US pat. 6,009,275) are analogous art because they are from the same field of endeavor of data transfer base on priority.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to modify the method is described and shown herein for assuring device access to a bus

having a fixed priority arbitration scheme such as a SCSI bus as described by Downer and a resource allocation logic for a computer system including a plurality of processors which share access to, and control of, a plurality of resources, such as disk drive units or busses as taught by Dekoning.

The motivation for doing so would have been because Dekoning teaches **"The Inter-Controller Communication Chip (hereafter referred to as the ICON chip) contains all functions necessary to provide high speed serial communication and resource arbitration/allocation between two Disk Array controllers. The primary application for the ICON chip is in Disk Array systems utilizing redundant disk array controllers. Because the redundant controller configuration shares resources (disk drives and SCSI buses) between two controllers, a method of arbitrating for these common resources must be utilized in order to prevent deadlocks and to maximize system performance"; see col. 4, lines 54-64).**

Therefore, it would have been obvious to combine Dekoning et al. (US pat. 6,009,275) with Downer (US pat. 6,223,244) for the benefit of creating a system with a SCSI controller having a queue to obtain the invention as specified in claim 12.

18. As per <u>**claim 23**</u>, Downer discloses "A device **(any of the peripherals in fig. 1)** in communication with an initiator **(Host computer 14 in fig. 1)** and an Input/Output (I/O) controller **(Host computer 18 in fig. 1)** over a bus **(SCSI bus 12 of fig. 1)**, wherein the device includes circuitry capable of causing operations comprising **(all electric devices are function by electric circuitry)**: receiving, as part of a diagnostic operation with respect to an Input/Output

(I/O) controller **(see col. 8, lines 11-27, which discloses the computer hosts 14-20, which are serve as the reconnection inhibiter, initiator, and I/O controller, are able to check and determine on each other; in other word, a higher-priority initiator polls on a lower-priority initiator and wait for a ping. This is a form of diagnostic)**, a signal from the initiator **(see col. 1, lines 53-65)**; and accessing the bus to inhibit the Input/Output (I/O) controller from accessing the bus in response to the signal [**(as discloses by Downer, once the reconnection inhibiter (Host computer 16 in fig. 1) has access or ownership of the bus, the I/O controller (SCSI controller 18 of fig. 1) will be prevent from accessing the bus. See for example col. 1, line 53 to col. 2, line 10)**, wherein the initiator transmits, as part of a diagnostic operation **(see col. 8, lines 11-27)**, I/O requests on the bus to the I/O controller **Downer discloses the initiators (Host computer 14-20) on the bus communicate among each other though requests; "*Initiators communicate with targets through bus requests called commands*", as stated in col. 1, lines 46 and 47. The computer hosts can be both initiators and target, as discloses in col. 1, line 35, "SCSI devices are either initiators or targets, or <u>both</u>". In other word, a computer host device that's acting as an initiator will transmit and a second computer host that's acting as target will receive; as col. 1, lines 53-54 discloses "The SCSI architecture allows two, and only two, devices to communicate with each other over its bus simultaneously". In regards to 'as part of the diagnostic operation', this is the polls and pings, which obviously are not requests. However, the polls and pings, are part of or play a roll on the number of requests that are transfer over the bus. They are part of the 'operation'**], wherein the I/O requests are queued in an I/O queue **(Downer discloses the initiators (Host computers 14-20) on the bus communicate among each other through request; "*Initiators communicate with targets***

through bus requests called commands", **as stated in col. 1, lines 46 and 47. Therefore, as it well known in the art, requests are stored in storage devices such as queue, FIFO, or buffers. As also discloses in the 'Description of the related art' section, page 2, from the applicant's specification "The storage controller 6 I/O queue". In the same way, the SCSI controllers of the host computers 14-20 will inherently have queues as well)**, and wherein the I/O controller is inhibited by the device from draining the queue while the initiator transmits requests to the I/O controller **(as Downer discloses, when Host computer 14, the initiator with the highest priority ID, has access to the bus, automatically, the I/O controller (SCSI controller 18 of fig. 1) is inhibited by the reconnection inhibitor from draining request, which are in a storage device like a queue or a buffer; see for example col. 1, line 53 to col. 2, line 10)**; and performing diagnostic testing of the I/O controller when the I/O queue is at different levels **(As stated above, the diagnostic is interpreted as when a higher-priority initiator polls on a lower-priority initiator and wait for a ping. In regards to "when 'the I/O queue' is at different", the claim language doesn't specify as to which device on the bus this I/O queue belongs too. Downer discloses the initiators (Host computers 14-20) on the bus communicate among each other though request; "*Initiators communicate with targets through bus requests called commands*", as stated in col. 1, lines 46 and 47. Therefore, as a request is transmitted from an initiator, the device with the current ownership of the bus, the number of request from the initiator will be decremented by one. As it known in the art, requests are stored in storage devices such as queue, FIFO, or buffers)**, wherein the level of I/O requests pending in the I/O queue is controlled by the signaling of the reconnection inhibitor **(see col. 2, line 66 to col. 3, line 5, which discloses "If so, the higher-priority device**

is notified to limit the sending of new requests to the bus. The notifying may include sending a signal to the higher-priority device that the lower-priority device does not have sufficient access to the bus. The limiting of requests may include limiting new requests by the higher-priority device to its share of the bus bandwidth". Col. 4, lines 41-60, discloses the 'notification' as the pings and polls, which control or determine the chance that an initiator has to empty out it's queue on the bus).

Downer doesn't clearly express or shows a SCSI controller having a queue, even if it is clearly express above. However, Dekoning clearly shows a SCSI controller having an I/O queue **(see fig. 4A and col. 5, lines 14-26**).

Downer (US pat. 6,223,244) and Dekoning et al. (US pat. 6,009,275) are analogous art because they are from the same field of endeavor of data transfer base on priority.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to modify the method is described and shown herein for assuring device access to a bus having a fixed priority arbitration scheme such as a SCSI bus as described by Downer and a resource allocation logic for a computer system including a plurality of processors which share access to, and control of, a plurality of resources, such as disk drive units or busses as taught by Dekoning.

The motivation for doing so would have been because Dekoning teaches **"The Inter-Controller Communication Chip (hereafter referred to as the ICON chip) contains all functions necessary to provide high speed serial communication and resource arbitration/allocation between two Disk Array controllers. The primary application for the ICON chip is in Disk Array systems utilizing redundant disk array controllers. Because**

the redundant controller configuration shares resources (disk drives and SCSI buses) between two controllers, a method of arbitrating for these common resources must be utilized in order to prevent deadlocks and to maximize system performance"; see col. 4, lines 54-64).

Therefore, it would have been obvious to combine Dekoning et al. (US pat. 6,009,275) with Downer (US pat. 6,223,244) for the benefit of creating a device with a SCSI controller having a queue to obtain the invention as specified in claim 23.

VI. <u>RELEVANT ART CITED BY THE EXAMINER</u>

19. The following prior art made of record and not relied upon is cited to establish the level of skill in the applicant's art and those arts considered reasonably pertinent to applicant's disclosure. See **MPEP 707.05(c)**.

20. The following reference teaches fixed priority arbitration on a bus.

<u>U.S. PATENT NUMBER</u>

US 5,754,887

US 6,336,157

VII. <u>CLOSING COMMENTS</u>

<u>Conclusion</u>

a. <u>STATUS OF CLAIMS IN THE APPLICATION</u>

21. The following is a summary of the treatment and status of all claims in the application as recommended by **M.P.E.P. 707.07(i)**:

a(1) CLAIMS REJECTED IN THE APPLICATION

22. Per the instant office action, claims 1-6, 8-17, and 19-31 have received a final action on the merits.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

b. DIRECTION OF FUTURE CORRESPONDENCES

23. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ernest Unelus whose telephone number is (571) 272-8596. The examiner can normally be reached on Monday to Friday 9:00 AM to 5:00 PM.

IMPORTANT NOTE

24. If attempts to reach the above noted Examiner by telephone is unsuccessful, the Examiner's supervisor, Mr. Donald Sparks, can be reached at the following telephone number: Area Code (571) 272-4201.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

March 02, 2007

Ernest Unelus
Examiner,
Art Unit 2181

DONALD SPARKS
SUPERVISORY PATENT EXAMINER